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HOUSE PRICE SHOCKS, NEGATIVE EQUITY AND HOUSEHOLD CONSUMPTION IN THE UK IN THE 1990s

by

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Abstract

We examine the impact of housing capital gains on savings behaviour during the 1990s British housing market cycle using microdata from the British Household Panel Survey and county-level house price data. We condition the models on household real financial capital gains using Family Resources Survey data. We find a marginal propensity to consume out of housing wealth of between 0.01 and 0.03, depending on specification. Among our novel findings are asymmetric behaviour between periods of house price rises and falls, with stronger consumption response during periods of house price increases, and a disproportionate impact on saving if the household has negative housing equity.

Keywords: Saving, Housing wealth, House prices, Negative equity
JEL Classification: D91, E21, R31

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HOUSE PRICE SHOCKS, NEGATIVE EQUITY AND HOUSEHOLD CONSUMPTION IN THE UK IN THE 1990s

1. Introduction

The paper examines the impact of shocks to the value of housing wealth on household consumption in the UK. Unlike previous studies for the UK, we use long differences in household panel data to examine the impact of house price shocks on consumption, following the basic method utilised on United States data by Skinner (1989, 1996) and Engelhardt (1996).

We have several findings. Our basic finding suggests an average marginal propensity to consume out of housing wealth of between 0.01 and 0.03, depending on the specification – comparable to the modal estimates on US microdata. However, we also have novel findings relative to the US literature. First we examine the argument that consumption responses to house price shocks are asymmetric, as also suggested by both Engelhardt and Skinner. We find the reverse result from the US evidence, namely that consumption impacts of house price changes are stronger when house prices are rising.

We also have a new result concerning ‘negative equity’ – that the elasticity of consumption with respect to house price shocks is greatest when house prices are rising for households that had zero or negative equity values in their housing stock. The straightforward interpretation of this last result is that negative equity induces precautionary saving so that house price inflation that lifts households out of negative equity induces a disproportionately large consumption response (here, an average marginal propensity to consume out of housing wealth for such households of 0.04 to 0.06).

In following the US literature in using microdata to obtain these results, our results contrast with existing UK studies of the housing wealth-consumption relationship that have typically used time series analysis – whether at the national or regional level (Muellbauer and Murphy, 1990, 1995; Carruth and Henley, 1990a, 1990b; Miles, 1992, 1993a; Davey, 2001). However, our findings and methods also depart from the US studies in several respects. First, we use local house price variation over time from county-level surveys of house prices rather than self-reported values of housing wealth as our proxy for changes in household housing wealth, for two reasons. Such data can be constructed on a consistent basis in the UK (unlike the US, where regional house price data are typically too aggregated to capture local market variations). In addition, there is

a danger that self-reported values correlate with saving behaviour. Moreover in the estimates we allow for the accumulation (decumulation) of financial wealth through capital gains (losses) rather than relying simply on a measure of ‘active’ saving.¹

The plan of the remainder of the paper is as follows. The next section briefly discusses the issues and the existing literature. Section 3 describes the data sets, and how we utilise them. Section 4 describes the econometric procedures and the main results. Section 5 concludes.

2. Issues and previous literature

In the basic life cycle model of saving, increases in the value of housing wealth should increase consumption, even when there are bequest motives and borrowing constraints (Skinner, 1994). A similar story arises in the permanent income hypothesis, if housing wealth is treated as annuitisable wealth, and also in a simple ‘story’ where the household attempts to maintain a constant income-wealth ratio. There has been discussion in the United Kingdom literature as to whether the house price boom of the mid-1980s fuelled the consumption boom in the economy at that time (Muellbauer and Murphy, 1990; Attanasio and Weber, 1994) and, more recently, as to the contribution of realised capital gains – both on financial wealth and housing wealth – to the decline in the UK household saving ratio since the mid-1990s from around 10% to less than 4% of post-tax income by mid-2000 (Davey, 2001). Similar arguments have been discussed in the United States – see, for example, Bosworth, Burtless and Sabelhaus (1991).

Housing wealth is intrinsically less liquid than financial wealth. Thus while ‘active’ saving in financial assets seems to be highly responsive to real capital gains and losses on financial assets,² active saving may be less responsive to changes in housing wealth. Housing bequest motives may be strong, and households may be unwilling to extend their debt, or to move, in order to release housing wealth.³ Moreover, it has been argued that individuals partition their wealth into fungible and non-fungible ‘accounts’ as a form of self-control mechanism (Thaler, 1990). Thus the magnitude of the propensity to consume out of housing wealth, and the circumstances and types of household where

¹ It is inconsistent to model the impact of capital gains (losses) in housing wealth whilst ignoring capital gains (losses) in financial wealth in the calculation, particularly as there is much evidence from the US that the decline in the measured ‘active’ saving rate has been driven by rising financial wealth, especially in the equity market – see below.

² For US evidence: see, *inter alia* Gale and Sabelhaus (1999), Poterba (2000) and Dynan and Maki (2001) for recent surveys. For the UK, see Davey (2001).

the greatest response is observed, are ultimately empirical issues. Nevertheless, given that home ownership is a key form of household wealth-holding in the United Kingdom, even a small response may generate large aggregate impacts on active financial saving.

Time series evidence for the United States based on aggregate consumption and aggregate housing wealth, whether estimated as a specific consumption function or through an Euler equation, generally gives a marginal propensity to consume out of housing wealth of 0.04 to 0.05 (Peek, 1983; Bhatia, 1987; Skinner, 1994, 1996). However, US evidence based on household data sets gives very mixed results. Typically these studies use a self-reported measure of ‘active’ saving and a measure of self-reported housing wealth (or equity, net of mortgage) less any reported value of home improvement work, since there may be a negative correlation between active saving and the latter. For example, first differences of the Panel Survey of Income Dynamics from 1976-81 in Skinner (1989) give a positive effect of housing wealth on consumption across households, but controlling for selection of movers and allowing for taste differences seems to eliminate these effects.

There are few United Kingdom studies that provide a coefficient that can be interpreted as a ‘marginal propensity to consumer from housing wealth’. Nevertheless, Muellbauer and Murphy (1995) obtain an average elasticity of 0.045. Carruth and Henley (1990b) obtain estimates that imply an elasticity of 0.04. Miles (1993a) obtains a simulated elasticity of 0.02, but Miles (1997), using cross section data, gets higher responses but the coefficients are very unstable.

A further empirical finding from the US literature is that there seems to be an asymmetry of response between gains and falls in housing wealth. One explanation for possible asymmetric behaviour in response to housing capital gains is that housing gains may be anticipated, but losses not so (Skinner, 1993). Skinner (1996) finds greater sensitivity of consumption to falls in housing wealth – indeed there is no significant effect of rising house values on consumption in his work, whereas for falls the marginal propensity to consume is 0.1. However Engelhardt (1996) gets significant responses to shocks in both directions (0.004 to 0.08 to rises, 0.04 to 0.13 for falls) albeit again with greater responsiveness to house price falls. Again, however, results are highly sensitive to estimation method, such as the choice of treatment of outliers. To our knowledge, there are no studies of house price-consumption response asymmetries for the UK. There is

³ Especially elderly households: see, for example, Venti and Wise (1990). But see, for the UK, Disney, Henley and Stears (2002).

also evidence that households may respond differently to housing shocks which imply nominal wealth losses, as opposed to changes in real prices, although such studies focus primarily on the impact of nominal losses on housing mobility (Engelhardt, 2001; Genosove and Mayer, 2002). The amount of equity contained in the housing also has an effect on mobility (Genosove and Mayer, 1997). Since mobility is a major source of equity release, this is an important indirect determinant of the impact of housing wealth on consumption, with Disney, Henley and Stears (2002) finding clear differences in financial saving responses to house prices shocks between movers and non-movers among elderly households in the UK. Thus it is important to check estimated results for conditioning on movers versus non-movers, and to investigate selection effects in moving behaviour.

3. Data

We utilise household level longitudinal data on savings and holdings of financial wealth in order to identify the cross-sectional variation in house price movements on household saving behaviour over time. The British Household Panel Survey (BHPS) provides longitudinal data on “active” saving; that is non-negative transfers from current income into financial wealth. The BHPS is an annually repeated panel survey of around 5000 households resident in Great Britain to the south of the Caledonian Canal, commencing in 1991.

The precise form of the question on saving asked of each individual in the household is *“do you save any amount of your income for example by putting something away now and then in a bank, building society, or Post Office account other than to meet regular bills?”* Note that this form of the question purges holdings of financial assets of those that arise simply because of the discreteness of the payment period. The average amount saved in this way each month over the last year is recorded. From Wave 2 onwards a similar supplementary question is asked about monthly contributions to private pension schemes. We define “active” saving as the sum of these two aggregated across all adult household members. Summary information on this saving measure for each wave from 1992 to 1999 is reported in Table 1. Just under a half of all households report some active saving. The average for those who save is £180 per month, and for all households is £83 per month.

Turning to real housing gains, we have in principle two alternative methods for calculating the real appreciation in the value of the household’s home over the period of

analysis. The first is to make use of each respondent's annual estimate of the current market value of his or her home. However this measure of housing capital gain is contaminated by expenditure on improvements and additions and by moving behaviour, both of which are likely to correlate with measures of financial saving.⁴ The BHPS provides only incomplete information on home improvement activity.⁵ An alternative approach, adopted here, is to use changes in average market value in the locality in which the household was resident at the start of the period. More precisely we use the change in the average market price of a semi-detached residence in the 1993 county of residence (out of 65 counties deflated by the UK retail price, excluding mortgage repayments, index, as reported on a quarterly basis by the Halifax Bank.⁶).

Table 2 reports the distribution of real house price shocks measured in this way across the BHPS sample of owner-occupiers over the period 1993 to 1999. The average real housing gain over the full period is £21,207, although as the lower median value indicates there is some skewness in the distribution of gains. There is widespread variation in the scale of the house price "shock" across households. In fact 15.6% of owner-occupiers experienced a real fall in house prices over this period. The period 1993 to 1995 was a period of slowing falling house prices after the "bust" at the beginning of the 1990s. Real losses were widespread with 87.7% of the sample experiencing a real fall in house prices. The average negative shock up to 1995 was over £2000. The period from 1995 to 1999 was one of recovery, culminating in quite sharp rises in 1999. 97.6% of the sample experienced real housing appreciation, and the average gain was over £23,000.

As discussed in Section 2, in order to estimate the true relationship between a real house price shock and active saving, account must be made of any correlation between the housing shock and other financial components of the household balance sheet, by controlling for the effect of "passive" saving (Engelhardt 1996) which occurs through the real appreciation or depreciation of financial wealth. This has not typically been done

⁴ Home improvements (raising housing equity) may be negatively correlated with financial saving measures, if partially or wholly funded out of financial wealth. Moving will involve transactions costs, which may again be borne out of financial wealth, but may also be utilised to release housing equity, especially among older households.

⁵ Information is available where improvements and additions were financed through an additional mortgage or loan advance. There is some evidence of overestimation of house values particularly during the early 1990s when the housing market was in recession, and this further complicates the use of self-reported gains. Nevertheless, as Engelhardt (1996) notes, self-reported or perceived gains may be a more informative driver of savings decisions than actual gains.

⁶ The Halifax Bank (formerly Halifax Building Society) is the largest lender for home purchase in the UK.

in studies of this kind. Unfortunately, the BHPS does not question respondents on an annual basis about levels of financial wealth.⁷ Consequently for information on financial wealth we use the annually repeated cross-sectional Family Resources Survey (FRS).⁸ The model estimated on FRS is a reduced form to explain financial asset holdings in terms of the demographic characteristics and economic activity status of the head of household and spouse (if present), household composition and housing tenure status. This model is used to impute financial asset holdings for each individual in owner-occupier households in the BHPS from 1993, and household financial wealth is then obtained by aggregating within households.⁹ In effect therefore we construct an instrumental variable for (unobserved) financial wealth for BHPS households using the right-hand side variables as instruments.

We use data from seven available surveys up to the fiscal year 1999/2000. The Family Resources Survey is collected to inform government policy on the social security system, and the questionnaire is designed to illicit detailed information on individual level wealth within a critical wealth band of £1,500 to £20,000, with censoring outside this band. Table 3 therefore reports a tobit estimation using data pooled from all seven available cross-sections, with upper and lower censoring points imposed to coincide with the questionnaire design.

The results show that nearly all the demographic variables included have very well determined coefficients, with sensible signs and values. Liquid wealth increases with age, but at a declining rate. Wealth peaks at 58.7 years of age. Children drain financial resources, and at a higher rate as they are older. Divorce, widowhood and ethnic status each have a substantial depressant effect. The economically inactive have higher financial wealth. The achievement of a university degree is associated with substantially higher wealth. Relative to the base of outright ownership, other forms of housing tenure are associated with lower wealth, especially rental status and in particular public sector rental.

⁷ Information on financial wealth holding was gathered in wave 5, but this exercise has only been repeated in wave 10 (at the time of writing unavailable).

⁸ The FRS covers the same geographical area as the BHPS, and has achieved a sample for each fiscal year (April to March) of 23,000-25,000 households, since 1993/1994. The questionnaire includes detailed information on financial asset balances. Financial wealth is defined as including money left in any current account at the end of the month, the balance of any form of interest-bearing deposit or savings account and the value of stocks, shares, national savings and premium bond issues. Assets held by children in the household are also included. However it should be noted that this measure ignores the liabilities side of the household balance sheet as not information on (non-mortgage) debt is solicited.

⁹ The FRS survey is conducted throughout the year on a fiscal year (April to March) cycle. The BHPS is conducted in the final quarter of each year, broadly in the middle of each FRS survey period, and so FRS 1993/1994 is matched to BHPS 1994 etc.

Finally the data reveal, *ceteris paribus*, significant regional variations in wealth, with households in Wales fairing particularly badly and households in Scotland and Northern England also showing lower wealth (relative to the London base). The ranking of the coefficients on these regional dummy variables correlates closely and positively with average regional house prices, pointing to the dominance of a scale rather than a portfolio effect.

4. Estimating the Impact of Housing Gains on Saving

Defining cumulative household active saving from period 0 to the current period as s_a , and household financial assets as A , then the identity relationship between the change in financial assets and active and passive saving over the same period (capital gains on holding financial wealth), s_p , for household i is as follows:

$$(1) \quad A_i - A_{0i} \equiv \Delta A_i \equiv s_{ai} + s_{pi}$$

All variables are expressed in real terms. In order to investigate the effect of housing gains on active saving we specify an estimating equation with cumulative active saving as the dependent variable and right-hand side variables in “long” differences to control for both the stock adjustment impact of the initial level of financial assets and the scale of passive saving, and to model the impact of real housing shocks:

$$(2) \quad s_{ai} = \alpha_0 + \alpha_1 \hat{A}_{0i} + \alpha_2 s_{pi} + \alpha_3 \Delta h_i + \alpha_4 \Delta h_i \cdot D_{0i}^{ne} + Z'_i \gamma + \varepsilon_i$$

where Δh_i is the real house price shock, D_{0i}^{ne} is a dummy variable to investigate the differential impact of a shock on a household initially in negative equity, Z'_i are other control variables, α_j and γ are coefficients and ε_i is an error term. $\hat{\cdot}$ denotes that the asset variable is imputed. Equation (2) as it stands cannot be estimated because we cannot directly observe or impute s_{pi} . We therefore replace s_{pi} with our imputed change in financial assets, $\Delta \hat{A}_i$, to give:

$$(3) \quad s_{ai} = \beta_0 + \beta_1 \hat{A}_{0i} + \beta_2 \Delta \hat{A}_i + \beta_3 \Delta h_i + \beta_4 \Delta h_i \cdot D_{0i}^{ne} + Z'_i \gamma' + \varepsilon'_i$$

Using the identity in (1) the underlying marginal propensity to consume from housing wealth (given by $-\alpha_3$ in equation 2) is now $-\beta_3/(1-\beta_2)$, and that for a household in negative equity (given by $-(\alpha_3 + \alpha_4)$ in equation 2) is now $-(\beta_3 + \beta_4)/(1-\beta_2)$.

Table 4 reports estimates of equation (3). All estimates are obtained using a robust median regression estimator, in order to deal with problem of the censoring of active saving at zero, and to mitigate the impact of its distributional skewness. All monetary variables are converted to 1995 prices using the UK retail price (excluding mortgage repayments) index. Estimation includes control variables as follows: real household income in each year covered by the period in question, a binary variable for initial outright home ownership (i.e. no mortgage), a quadratic in the initial age of the household head, the ethnic minority status, gender and initial marital status (married/cohabiting, separated/divorced or widowed) of the household head, binary variables for a change in marital status, binary variables for the initial economic status of the household head and spouse (employed, self-employed, retired), binary variables for the retirement of the head or spouse during the period, binary variables for education to degree level of the head and the spouse, initial number of adults in the household and numbers of children in different age bands (0-2, 3-4, 5-11, 12-15, 16-18), binary variables for a head and a spouse smoker, and a binary variable for membership of an occupational (company) pension scheme.¹⁰

Column (1) reports a base specification that includes the initial level of real financial assets and the real housing gain on the right hand side. The real house price shock has a statistically significant negative effect on the level of real household saving between 1993 and 1999, and indicates a marginal propensity to consume from housing wealth of 0.01. However, as column (2) reveals, this estimate is biased downwards by the omission of the effect of passive saving (the change in financial assets) on active saving. Once the change in real financial assets is included the coefficient on the real housing gain rises in absolute size by half and the implied marginal propensity to consume is now 0.028.

¹⁰ This variable attracts a consistent, negative coefficient in the active saving regressions implying that occupational pension scheme membership reduces total saving between 1993 and 1999 by £540 at the mean. This suggests, unsurprisingly, that occupational pension scheme membership is at least a partial substitute for personal pension saving and perhaps active saving generally.

Households in negative equity

Households may make a greater adjustment to their saving behaviour in response to housing capital gains if those gains correspond to a reduction in household balance sheet “distress”. During the early part of the 1990s nominal house price falls were common and a significant minority of households experienced negative housing equity (i.e. their loan to house value ratio exceeded unity). The proportion of owner-occupier households in negative equity in the estimation sample in 1993 is 7%. Column (3) includes the interaction of the real housing capital gain with the initial negative equity dummy variable.¹¹ The interaction effect attracts a negative coefficient that is statistically significant at 9 per cent. The results suggest that the marginal propensity to consume from real housing gains is almost three times higher for households in negative equity. It should also be noted that the interaction coefficient is more precisely determined for the 1995-99 period during which house prices were rising (statistically significant at 0.3%). This is discussed further below.

Selection bias from the inclusion of mover households

The sample used so far includes both households who stay at the same address between 1993 and 1999 and those who move (at least once) during this period. House moving by owner-occupiers may be associated with significant portfolio adjustments between housing and financial wealth. Disney, Henley and Stears (2002) find significant differences in passive saving behaviour between movers and non-movers in a sample of older (over 50 years of age) households. Moving may provide a ready vehicle through which to release housing capital gains. Given this it is important to consider the question of the impact of mover-stayer selection bias on our estimates.

Column (4) re-estimates the specification in column (3) for non-movers on their own allowing for a selectivity correction. The moving decision is identified using additional information about household composition, residence type and the size of the household relative to that of the residence in 1993, along with a dummy variable capturing a stated preference in 1993 for moving house. As the sample size information shows 71% of the 1993 sample of owner-occupiers remained at the same address through to 1999. The coefficient on the selectivity correction term is statistically significant at 6 per cent, and there is some reduction in the size and significance of real housing gain coefficients, particularly for the negative equity effect. Nevertheless for

¹¹ Henley (1998) describes the construction of this variable for the BHPS data.

owner-occupiers with positive equity we still find evidence for a housing gain offset on savings, even if those households do not actually move to realise that gain.

Asymmetric behaviour in response to movements in housing wealth

As discussed in section 2, US research has suggested that owner-occupier households behave asymmetrically to nominal housing gains and losses. The results presented in columns (5) and (6) of Table 4 investigate this issue. Rather than attempting to differentiate the effects of upward and downward house price movements in cross-section, we estimate separate regressions for active saving for 1993 to 1995, when as Table 2 showed most households experienced real housing losses and 1995 to 1999 when real housing losses were minimal.

The results confirm that households behave very differently in response to real housing gains compared to losses. However the direction of the effects are the reverse of those found by Engelhardt (1996) for the United States. The effect of the real house price shock is statistically significant for the period of housing gains but not for losses. Furthermore the negative equity interaction effect is now strongly significant during the period of gains. For owner-occupiers with positive equity the implied mpc from a positive housing wealth gain is 0.009, but for those in negative equity the mpc is almost five times larger at 0.044 and more robust than in column (3). Thus the response for households with initial negative equity is also asymmetric.

5. Conclusion

Macroeconomic research has suggested that personal sector spending and saving behaviour in the UK may have become closely related to movements in house prices since financial deregulation of the housing finance industry during the 1980s. Life-cycle theory would suggest that unanticipated housing gains ought to result in offsetting effects on saving, although in practice these may be small and attenuated by capital market rigidities, bequest motives and the effects of precautionary saving.

This paper has presented the first attempt at a micro-econometric investigation of this issue using British data on owner-occupier households. Our results suggest that the marginal propensity to consume from real housing gains during the 1990s was between 0.01 and 0.03 for the median household, that is a £1000 real housing capital gain may have resulted at the median in an £10 to £30 reduction in active saving over the

period 1993 to 1999. This result is comparable to Engelhardt's (1996) estimate of an mpc of 0.03 for United States owner-occupiers over the period 1984 to 1989. Furthermore we find that considerably stronger effects of real housing shocks on saving are to be found for households initially in negative equity, especially when house prices are rising. At the median our mpc estimates are between 0.04 and 0.06. Finally our results suggest that households behave differently in response to positive and negative real housing wealth shocks, and point to a important difference between British and North American households. British households reduce saving as real housing wealth increases but do not appear to save significantly more in response to a fall in house values. Again this is particularly so for households with initial negative equity.

These results may partially explain the observed macroeconomic correlation between house prices and consumption. In Great Britain in 1995 16 million owner-occupiers¹² had housing with an average value of £79,000. The average real gain between 1995 and 1999 was 11%, translating to an increase in real housing wealth of £139 billion. With an estimated mpc of 0.01 this translates in to an increase in consumption of £1.4 billion, or a 0.3% growth in the 1995 total.¹³ While this result goes some way to explain the observed macroeconomic association between real house prices and personal sector spending, it is rather smaller than earlier macroeconomic estimates for the UK. The reconciliation of the results remains an important avenue for further research.

¹² Source: Office for National Statistics, Housing Statistics in Great Britain, September 2000.

¹³ 1995 households final consumption expenditure was £455 billion, source Office for National Statistics.

Table 1: Active Saving by Households

Year	% of households with active saving or contribution towards a Personal Pension	Mean non-zero active saving (1995 £'s per month)	Mean active saving of all households (1995 £'s per month)
1992	45.1	166.01	74.88
1993	44.4	167.92	74.55
1994	45.6	169.98	77.56
1995	45.0	184.57	82.96
1996	45.2	188.85	85.32
1997	48.0	186.92	89.78
1998	48.9	191.28	93.55
1999	46.7	186.93	87.30
All Years	46.1	180.36	83.13

Source: computed from BHPS Waves 2 to 9, using sample household weights

Table 2:
Distribution of Real House Price Shocks across Owner-Occupier Households

1995 prices	1993-99	1993-95	1995-99
<0	15.6%	87.7%	2.4%
0 to 10000	34.1%	12.3%	34.7%
10000 to 20000	14.2%	-	19.4%
20000 to 30000	14.2%	-	10.9%
>30000	22.0%	-	32.6%
Average change	£21,207	-£2,381	£23,179
Median change	£10,700	-£2,982	£14,235

Source: computed from BHPS Waves 3, 5 and 9 and county house price data from Halifax plc.

Table 3: Reduced Form Model of Household Financial Assets

Dependent variable: individual financial assets	Coefficient	Standard Error
Age	179.62	6.82***
Age squared	-1.53	0.07***
Female	-226.47	35.41***
No. of adults in household	-286.67	26.77***
No. of children 0-4	11.65	48.00
No. of children 5-10	-173.58	41.53***
No. of children 11-15	-188.78	45.94***
No. of children 16-18	-282.73	75.96***
Married/Cohabiting couple	-1349.21	60.00***
Separated/divorced	-507.93	86.88***
Widowed	-227.52	79.64***
Ethnic minority	-329.37	104.88***
Self-employed	117.89	70.19*
Unemployed	-167.08	124.39
FT education/inactive	285.21	76.27***
Long term sick	-409.33	107.44***
Retired	159.72	75.71**
Degree	562.22	56.43***
Spouse with degree	237.38	73.21***
Home mortgaged	-720.87	49.22***
Home rented (private sector)	-903.82	74.67***
Home rented (public sector)	-1741.19	59.20***
Region: North	-261.29	95.56***
Yorkshire & Humber	-327.84	82.38***
North West	-364.06	77.53***
East Midlands	-376.07	80.87***
West Midlands	-531.79	78.12***
East Anglia	-216.26	95.03**
South East	-118.15	66.42*
South West	-163.99	77.67**
Wales	-487.51	101.22***
Scotland	-424.60	83.23***
Intercept	3127.33	196.08***
Year dummy 1994/1995	289.09	61.60***
1995/1996	121.86	62.64*
1996/1997	183.94	62.77***
1997/1998	206.45	63.04***
1998/1999	292.43	62.88***
1999/2000	182.11	61.56***
Sigma	3954.80	12.10***
N	54,721	
Log likelihood	-522597.1	

Source: computed from pooled annual Family Resource Surveys, 1993/1994 to 1999/2000

Estimation: Tobit with censoring at £1,500 and £20,000

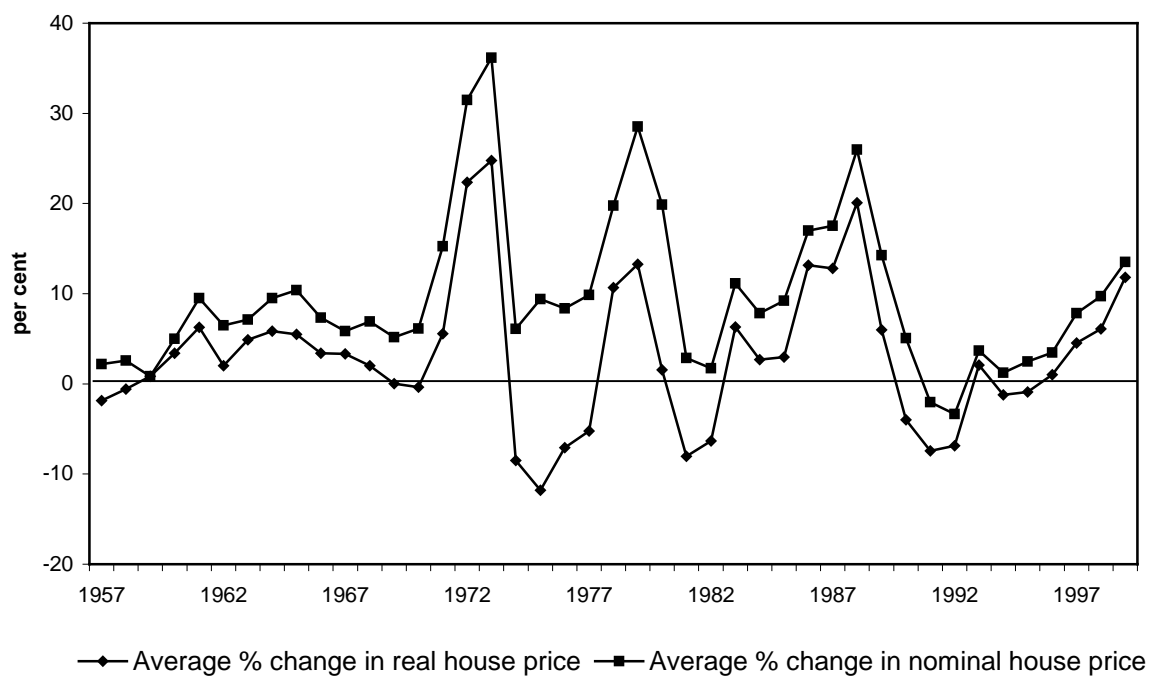
Note: * denotes significance at 10%, ** at 5%, *** at 1%

Table 4: Median Regression Saving Estimates

	(1) 1993-99	(2) 1993-99	(3) 1993-99	(4) 1993-99 Non-movers	(5) 1993-95	(6) 1995-99
A	0.670 (0.126)***	0.910 (0.099)***	0.881 (0.149)***	0.725 (0.178)***	0.356 (0.048)***	0.382 (0.089)***
ΔA		0.466 (0.085)***	0.390 (0.128)***	0.223 (0.166)	0.116 (0.055)**	0.246 (0.086)***
ΔH	-0.010 (0.005)**	-0.015 (0.003)***	-0.013 (0.005)**	-0.011 (0.006)**	-0.002 (0.015)	-0.007 (0.003)**
$\Delta H.D_{ne}$			-0.025 (0.015)*	-0.019 (0.025)	0.004 (0.044)	-0.026 (0.009)***
Selectivity				2337.4 (1231.5)*		
N	2293	2293	2221	1566	2632	2465
Pseudo R ²	0.217	0.219	0.219	0.207	0.168	0.202
Mpc	0.010	0.028	0.021	0.014	0.002	0.009
mpc D _{ne} =1			0.062	0.039	-0.002	0.044

Source: computed from BHPS Waves 3, 5 and 9

Notes: Standard errors in brackets; * denotes significance at 10%, ** at 5%, *** at 1%; regressions include additional demographic and other controls as described in the text. Full results available on request. Selectivity correction in column (4) uses year of start of current residence spell in 1993, dummy for stated preference for moving in 1993, household size in 1993, “excess” rooms (number of main rooms/household size) in 1993 and dummies for detached, semi-detached and apartment properties as instruments. Reported results are from two-step estimation and reported selectivity coefficient is for the inverse Mills ratio.

Figure 1: Annual Change in Average UK House Prices 1957-1999

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